PLAN YOUR NEXT MOVE

BY C3

Warehouse Software Systems

The Brains Behind the Operation

C3 Solutions

SOLVING FOR RETAIL

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There is a bloody battle taking place in the world of retail sales. It's a fight to the death to win customers. Whether you operate in cyberspace trying to attract e-commerce buyers, or are focused on getting warm bodies into bricks-and-mortar stores, the struggle is intense.

The radical transformation of the retail environment over the past several years is leaving no room for complacency or **inaction**. E-commerce is a juggernaut powered by Amazon's dominance and it's changed just about every aspect of retail operations.

Not only has e-comm speeded everything up, with consumers now expecting same day or next day deliveries, it has also driven the demise of many a traditional retail outlet. Stores are closing, and retailers are facing massive costs to keep up with the demand for home delivery.

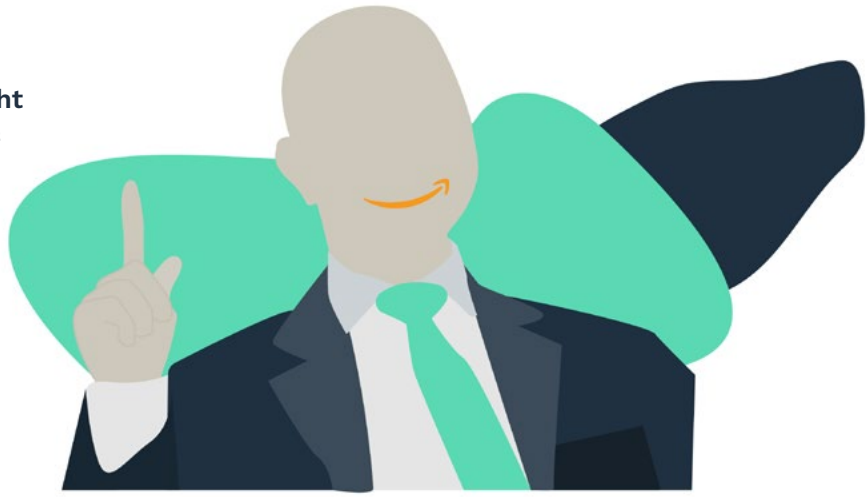
Amazon itself admitted that it will spend US$1.5 billion MORE than anticipated to up its delivery game from two days to one[1]. As Amazon CEO Jeff Bezos said in explaining the move,

> **It's a big investment. And it's the right long-term decision for customers." [2]**
>
> **-** Jeff Bezos

If Amazon is taking a hit bigger than the GDP of many countries so that it can meet consumer demands, how are smaller retailers supposed to survive? It's not easy, that's certain.

Upping your technology game is key to survival. If you've been reading our retail series, you may have already seen our papers on **Automation**, **Emerging Technologies** and **Artificial Intelligence.** Choosing the right technology is the recurring theme in the battle for retail survival. It's like knowing which piece on the chessboard will make the move you need to stay in control of the game.

This time we are going to look at the absolutely fundamental importance of the software systems that underpin DC operations: Warehouse Management Systems (WMS) and the newer Warehouse Execution Systems (WES) and Warehouse Control Systems (WCS). These systems are the brains that help retail operations stay ahead of the competition, by enabling the addition of new automated systems.



As the DC becomes more complex and moves more quickly, that's where yard and dock automation plays a key role in ensuring that your DC operations can keep with the increased speed of automation. Being able to plan the arrival and departure of key inventory can make the difference in the success of an automation project – and our systems integrate seamlessly with operating software.

That's why we want to share this overview of the developments taking place in warehouse operating systems with you. As the complexity grows, so does the need to understand your options.

Read on to find out how the latest systems may work for your retail operation.

Warehouse Management Systems

WMS has been around since the ancient Egyptians needed a way to keep track of their grain crops. Their system – records written on papyrus – served to manage food supplies to prevent starvation in poor crop years. [4]

But it was really the development of innovative material handling systems in the mid-20th century that prompted the need for ways to keep track of more densely stored goods and higher levels of inventory. With the concurrent innovation in computing technology, inventory tracking systems were created that could generate automated reports.

The first contemporary WMS system on record was installed for a retailer – JC Penney – in 1975. In the 1990s systems proliferated and the industry experienced a mini-boom. Companies began to use rudimentary WMS to manage inventory and order fulfillment. At the turn of the century the first WMS supplier achieved revenues of US$100 million and offerings were enhanced for the first time with add-ons like transportation management systems (TMS). [5]

But WMS only really came into its own after the 2009 recession, as the economic rebound prompted the beginning of the **e-commerce boom** and renewed consumer spending. Demand for faster, more accurate order fulfillment required new solutions. At that time WMS was seen as one of the top technologies operations managers were considering to add to their arsenal. [6]

Managing Complexity

Warehouse management systems are designed to manage the many moving parts in a warehouse or DC. Usually integrated with a company's ERP. (enterprise resource planning) system, they organize the complexity of the interactions between the storage equipment, mobile machinery, humans and the transactions that make inventory move. And with the growth of e-commerce and **digitization**, these are just becoming more complex.

Consider just a sampling of the tasks – from the mundane to the intricate – that take place in the average warehouse or DC: Monitoring storage conditions; cleaning and getting rid of garbage; keeping the aisles clear; ensuring heating and ventilation are correct; maintaining security; inventory quality control; ensuring product is properly stored; keeping inventory counts up to date; scheduling cycle counts; ensuring safety stock; updating location labels; scheduling workers; ensuring safety; managing incoming and outbound loads; the list goes on and on [7].

WMS helps to manage the four main tasks of a warehouse:

Its role is essentially to optimize the movement of goods through the DC by making choices that are too complex for old-style paper-based systems. They receive information from auto-ID systems like RFID code readers and **IoT enabled** items as well as from information transmitted by vendors about inbound loads.

As distribution requirements become more complicated in an **omnichannel retail environment**, with both direct-to-consumer orders and store orders being fulfilled from the same location, the WMS needs to become more sophisticated. **The WMS serves the executive function of the warehouse, looking after its business requirements, while also maintaining vast amounts of data such as order info, inventory positions and past performance records**. The WMS churns away in the background, processing information and establishing objectives for each day's handling needs. [8]

This set of requirements is then communicated to the people or technology tasked with meeting those objectives.

The WMS ensures the best possible usage of every precious resource – time, labour and equipment – in the distribution centre. [9]

Warehouse Execution Systems

WES are an offshoot or evolution of WCS, and can encompass all the functions that might be controlled by both WMS and WCS. They are being born out of the need to better coordinate resources for omnichannel fulfillment.[13]

While it's said that WES software is being built as a more off-the-shelf solution than WCS, which is usually quite customized,[14] there is no standard set of tasks that WES performs. Each vendor is developing its own WES suite that either complements or supersedes the control systems and even sometimes WMS functionality.

An example of WES functions includes: workload planning, dynamic order allocation and release; shipping management; replenishment management; system balancing; real-time notification of order allocation, inventory and automation equipment status; business intelligence and reporting on warehouse operations.[15] These functions are not exclusive to the WES, and this is how the system may integrate with or replace the WMS or WCS.

Warehouse Control Systems

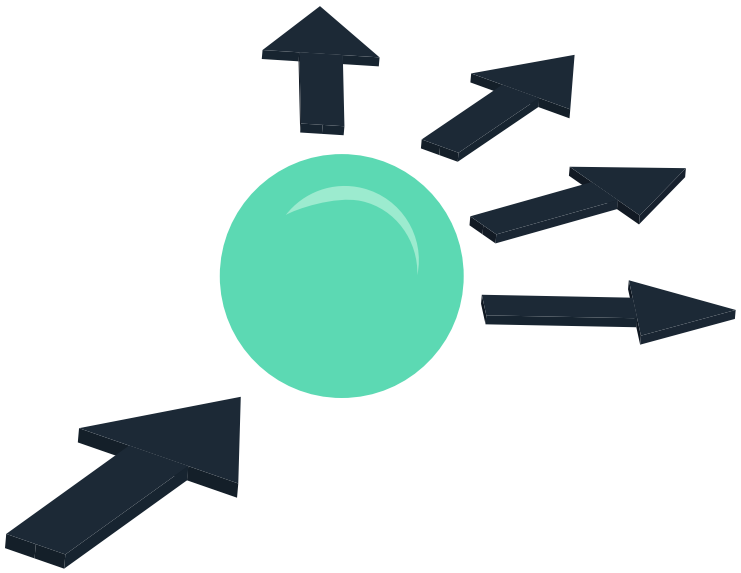
A WCS is the software interface between the WMS and **automated technologies such as AS/RS** (automated storage and retrieval systems), conveyors, palletizers, and automated guided vehicles (AGVs) or automated mobile robots (AMRs). Its role is to coordinate the activities of all these subsystems and ensure that everything is running optimally to produce maximum, accurate throughout. When the WMS determines what needs to be done it's the WCS's job to allocate the resources at its disposal to make things happen.

Using data on products, order lines, volumes, priorities and dispatch deadlines, the control system's tasks include allocating work to the equipment to keep systems in balance and avoid bottlenecks, and directing human operators and automated material handling equipment to stage product correctly for order fulfillment.
This entails performing specific tasks such as sending cartons to order pickers based on defined algorithms, allocating or reallocating floor space, and maintaining inventory control processes like first-in first-out (FIFO), and more. The WCS also generates reports that are communicated to the WMS, and collects information on its own performance. [10]

In an omni-channel DC the WCS may also be tasked with balancing order picking across the channels so that both e-commerce and store orders can be managed at the same time and in the same space. As well, when picking e-commerce orders the WCS may have the capability of directing orders to the correct carton size. These higher-level functions are what are known as add-on capabilities that let flexible WCS software accommodate new technologies in the DC.

Some WCS – when applied with voice-picking technology, for example – can track individual workers' productivity, as well as identify zones where picking is not performing at an optimal level.[11] Real-time data like this allow managers to shift labour to where it's needed and will be most productive, thus helping to keep costs under control.

One of the chief benefits of a WCS is the speed with which it controls activity in the DC. Microseconds matter with e-commerce fulfillment, and the control system is able to use the data from devices and the instructions from the WMS to make decisions and adjustments on the fly. [12]



Speed is of the Essence

Whether your operation is using a WMS, WCS or WES, or even all three, the table stakes for retailers trying to win in the omni-channel world is speed. **From the time an order is placed by the customer, to the moment it arrives on their doorstep or gets picked up at a retail outlet, every second counts.**

All the steps in between that order's receipt and final fulfillment are manageable through these iterations of warehouse management software. It's a sophisticated, highly orchestrated process that links together information about inventory levels and locations, order details like destination and shipping speed, and starts making decisions about how that one order fits in with all the rest being processed at the same time. For Amazon, that means keeping track of almost 120 million different products[16] and being able to sell and fulfill more than 100 million items in a 36-hour period on Prime Day 2018. [17]

The WMS Gap

While nobody compares to Amazon and no other retailer has the infrastructure to compete with the **e-commerce juggernaut**, you have to put resources behind your own e-commerce efforts to stay competitive. Yet, it's amazing how many distribution operations are running without the benefit of even a basic warehouse management system.

In 2018, estimates suggested that a third of businesses still had not implemented a WMS. The Warehousing Education and Research Council (WERC), which made the calculation based on its own research, noted that trying to run a DC without a WMS would make implementing automated processes impossible.[18]

Many companies are

> **operating in a no-man's land between knowing that consumer omnichannel shopping is really starting to affect them and recognizing that their store-centric supply chains and supporting systems will need fundamental modernization, "**
>
> says one analyst.[19]

As they come to this realization, it appears that WMS adoption is set to increase. Recent research predicts that sales of WMS will increase by about 16 percent a year, on the back of demand for cloud-based services.[20] Cloud-based WMS – like other **software as a service models** – will grow in popularity because of its ease of implementation and lower upfront costs.

But although it may be obvious from picking errors, poor customer satisfaction or even declining sales that an upgrade is needed, figuring out what to choose can be just as daunting. The number of options available is huge, and each has to be evaluated on what it can deliver and how much it will cost to implement – both in terms of the time it takes to transition, and the financial cost.

On the other hand, allowing your operation to continue being hamstrung by poor processes when there are solutions available is a questionable business decision. Taking the plunge and **making the investment in a proper software system** is nothing short of a necessity for retail distribution.

As one retail operations manager succinctly put it:

> **To achieve a high service and at the same time not tie up cash with too much stock or empty locations, is not done by best judgment. It's optimum all the way through the supply chain these days."** [21]

Achieving Optimum

Optimizing your retail distribution operation should be a priority. You need to be able to manage the speed, order volume, SKU proliferation and omni-channel challenges that come with 21st century sales. Are you filling orders from the DC, from the store, from the DC for in-store pick-up? **How are you keeping on top of it all?**

Let's assume that if you are not already operating a WMS-enabled DC, or a more sophisticated system, you are considering one. And if you are running with automation already, have you considered all the areas of the DC that might benefit from a sophisticated, digitized approach? We're talking about the key gateway that goods pass through to enter and exit your facility – the docks. All the functions we've explored in this paper depend on you having inventory on hand when you need it. Not a day late, not hung up on a truck that's **waiting in line for an open dock door**, and not early, either, when you're not ready!

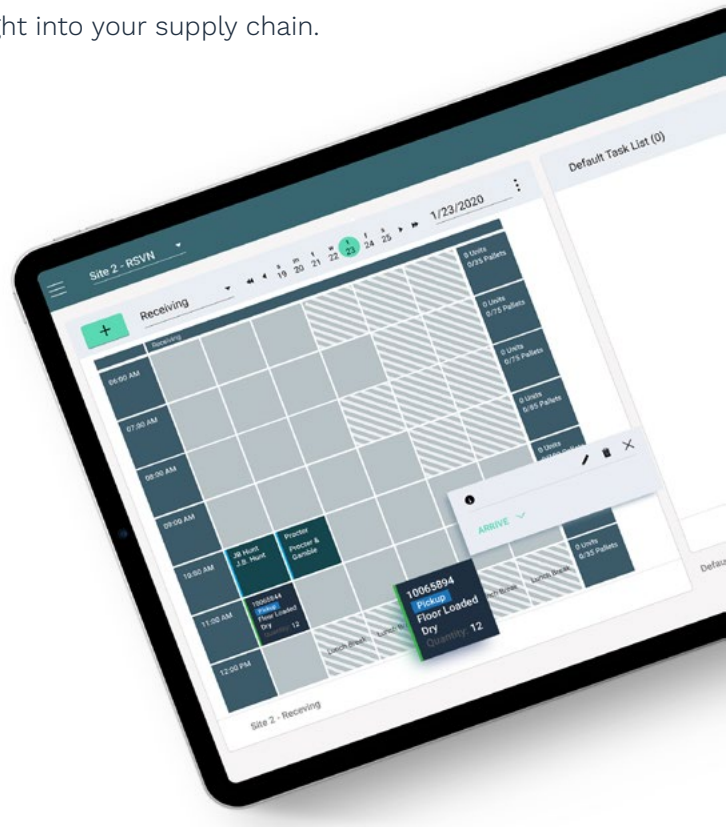
Eliminate Bottlenecks

The best way to enhance the performance of the docks – this key interface with the rest of your distribution chain – is to implement a dock scheduling system. Sure, you may be making appointments with carriers using a spreadsheet, following up with phone calls. **But how does that really work with the speed and accuracy you need to fulfill e-commerce orders?**

When the truck doesn't show up your workers are left loitering with nothing to do and you have to shift them around on the fly to keep them busy. Or multiple trucks show up at the same time, complaining about traffic tie-ups and you get dinged with **detention charges** because you can't unload them all at once.

These are not optimized operations. But you can do better. A **C3 Solutions dock scheduling suite** can eliminate the bottlenecks at your dock by allowing truck drivers to make their own appointments based on door availability via an online portal.

You control the rules that govern the schedules and you get the feedback and information about how you and your partners perform. The appointment scheduling system can be integrated with your WMS or ERP and TMS to ensure even more accurate tracking and giving you even more insight into your supply chain.



The beauty and simplicity of the scheduling system should not mask its value to a high-volume retail fulfillment centre. And it can help you at your bricks-and-mortar outlets as well, where space may be at a premium and time of the essence in ensuring that stores have the stock they need to fill e-commerce orders.

Just remember that while a good WMS will be the overseer of all your DC operations, you also need to make sure that the moving parts – like dock doors – are being directed to their best advantage.

A scheduling system will give you pinpoint accuracy for the docks, and allow you to get all the other pieces in the right places to ensure success.

Dock scheduling will work to streamline operations whether you are all in with automation in your DC or are still at the assessment stage, trying to figure out the best way to integrate software controls and automated equipment. It can be adapted to your operational needs to ensure that product moves in and out of the DC efficiently, ensuring you have the best capabilities to meet e-commerce demand.

Fight the Paralysis

Just as you have to pick the right piece to win the chess game of retail, you also need to keep moving. Standing pat will get you backed into a corner and left with no maneuvering room.

Don't be intimidated by the tough choices ahead. Instead embrace the agility that you'll gain by making a choice that's right for your business model.

Ready to Plan Your Next Move?

PLAN YOUR NEXT MOVE

BY C3

Globally recognized as the masters of Dock Scheduling and Yard Management Software technologies; we've perfected the art of helping industry leaders move strategically through quickly changing landscapes so that operations continue to move smoothly.

At C3, we've dedicated ourselves to helping you plan your next move!

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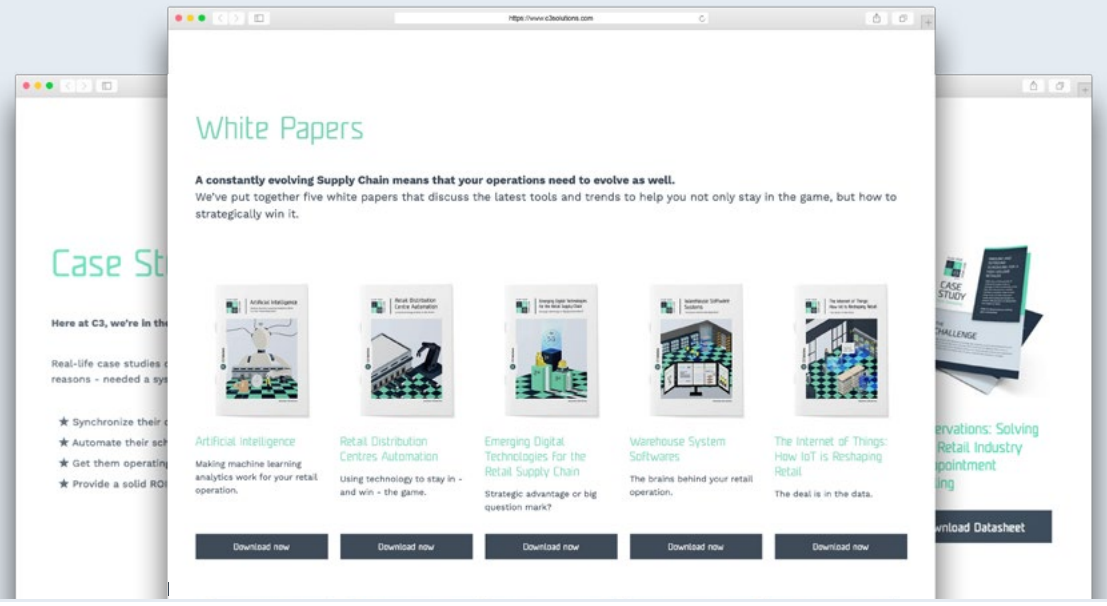

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